

1/15/99

Prepared for the Energy Director, Hawai'i County.

In ancient Greece, wood was used to heat homes, cook food, build houses, build ships and to smelt metal. The once ample supply of trees became so scarce that a law was passed to protect the olive trees on which commerce depended. Then, the Greeks "discovered" passive solar. A new town for 2,500 people was built, using passive solar designs to warm the homes in winter.

This same scenario was repeated during Roman times. Wood became so scarce that the great smelters on the island of Elba were forced to shut down. Wood for heating and cooking was imported to Rome by ship from as far as one thousand miles away. Then, just as the Greeks had done before them, the Romans "discovered" solar power for heating homes and even the popular public baths. Glass had now been invented and the Romans found that large glass windows faced south were efficient in warming the interior. A Roman law prevented anyone from blocking the sun from falling upon a neighbor's building.

In the United States (and Hawai'i) despite our pride in technological progress, are we repeating the same mistakes made by the Greeks and Romans? We are. Our profligate over-use of natural resources must be recognized. New ways must be found to cut down on use before it is too late.

With the use of the Form Follows Function Solar design techniques briefly described in this paper, we can be comfortable, improve our health, and yet use less gas and electricity. We can save our finite resources and also save a LOT of money. Minuscule, that's the word for the energy savings from more efficient light bulbs. Also the word for the energy savings from more efficient appliances, even from more efficient air conditioners, minuscule. One architect is showing by example after example how to save resources, save money, and improve health. Now, to the basics, the wood stove and Delta T.

In a wood stove, the air inside the chamber remains stagnant until a fire is lighted. When the air in the stove is at least 10 degrees F hotter than the air at the top of the chimney, this Delta T pushes the heated air up and out of the chimney. How does this hot air COOL a building? The air flow is always from warm to cool. Delta T is a scientist's way of expressing the temperature differential between two similar materials: in this case, two volumes of air. Yes, warm air does rise naturally, but languidly. Acceleration comes inside the stove by the lighting of the fire and is quickened by the height of the chimney. An architect can design a building to be like a wood stove's chamber and associate it with high out vents which function like a chimney.